

1 **METHOD OF EXTRACTING ISOFLAVON FROM SOYBEANS**

2 **BACKGROUND OF THE INVENTION**

3 1. Field of the Invention

4 The present invention relates to a method of extracting isoflavon from
5 soybeans, and more particularly to a method that not only extracts isoflavon
6 from the soybeans but also obtains high added-value byproducts of the soybeans.

7 2. Description of Related Art

8 In recent years, many nations have seen their traditional diets replaced
9 by high fat, low fiber and calorie rich foods. Unavoidably, such kind of eating
10 culture brings some syndromes such as corpulence, cancer, cardiovascular
11 disease, diabetes, osteoporosis which results in very serious health threats and
12 accordingly high medical costs to those nations. In order to cure the syndromes
13 caused from the new eating culture without creating other side-effects, medicine
14 scientists progressively research natural compounds from food to help people
15 suffering with those syndromes. Isoflavon is one of the natural compounds
16 obtained from soybeans.

17 Isoflavon has the same medicinal effect as estrogen that is used to ease
18 discomfort experienced by menopausal women. However, using estrogen in high
19 doses or over a long term causes some serious ailments such as breast cancer and
20 cervical carcinoma etc. Isoflavon does not have the side-effects as estrogen when
21 isoflavon is used to treat menopausal women. According to other medical reports,
22 isoflavon not only reduces the occurring chances of breast cancer, cervical
23 carcinoma, or oophoroma in women but also prevents prostate cancer and benign
24 prostate hyperplasia (BPH) in men. Additionally, isoflavon also can promote

1 absorption of calcium in bones to prevent osteoporosis.

2 Isoflavon is a broad name for a series of flavon compounds containing
3 glycosylated groups and non-glycosylated groups and has a complex
4 composition such that it is difficult to examine it using a standard pharmaceutical
5 procedures and also difficult to be permitted by institutions of public health.

6 A conventional method to obtain isoflavon from soybeans is shown in
7 Fig. 2. The method comprises acts of removing seed coats from the soybeans,
8 removing oil, making soybean powder, dissolving the soybean powder in ethanol
9 to remove protein, filtering the soybean powder, sopping the soybean powder
10 into solutions, absorbing isoflavon, eluting isoflavon, heating to remove
11 moisture from the eluted isoflavon, and granulating isoflavon products by spray
12 drying.

13 The conventional method directly uses soybeans to elute isoflavon and
14 has high cost. The seed coats of the soybeans are processed to become feeding
15 stuff and have no extra added-values. Because the manufacturing cost of
16 isoflavon is too high, isoflavon can not be used in common food to serve as
17 additives.

18 SUMMARY OF THE INVENTION

19 To overcome the shortcomings of the conventional method of obtaining
20 isoflavon from soybeans, the present invention provides a novel method of
21 extracting isoflavon to mitigate or obviate the problems associated with the
22 conventional method.

23 The main objective of the invention is to provide a method of extracting
24 isoflavon from soybeans that has low manufacturing costs and further generates

1 high added-value byproducts at the same time.

2 Other objects, advantages and novel features of the invention will become
3 more apparent from the following detailed description when taken in
4 conjunction with the accompanying drawings.

5 **BRIEF DESCRIPTION OF THE DRAWINGS**

6 Fig. 1 is a functional block diagram of a method of extracting isoflavan
7 from soybeans in accordance with the present invention; and

8 Fig. 2 is a functional block diagram of a conventional of eluting
9 isoflavan from soybeans in accordance with prior art.

10 **DETAILED DESCRIPTION OF PREFERRED EMBODIMENT**

11 With reference to Fig. 1, a method of extracting isoflavan from
12 soybeans in accordance with the present invention comprises the acts of: a
13 pulverizing process, a fermenting process, a first filtering process, an
14 extracting process, a second filtering process and a drying process.

15 In the pulverizing process (10), soybeans (or residuum of soybeans)
16 are pulverized to become granules of sizes less than 2mm diameter.

17 In the fermenting process (11), the granules are mixed with a
18 microorganism such as *Acetobacter aceti*. to ferment for 7 to 14 days to
19 generate fermented solid and fermented liquid containing soybean enzyme.

20 In the first filtering process (12), after the fermenting the granules are
21 filtered by centrifuge to separate the fermented solid and fermented liquid.

22 In the extracting process (13), the fermented solid is pulverized again,
23 sopped into an ethanol solution, and stirred at 45⁰C to 48⁰C for 24 hours to
24 extract isoflavan from the fermented solid of the soybeans.

1 In the second filtering process (14), the ethanol solution containing
2 isoflavon is separated from the fermented solid in the filtering process by
3 means of centrifuge.

4 In the drying process for isoflavon (15), the separated ethanol solution
5 is atomized and dried to become isoflavon powder by means of a spray drier.

6 Additionally, the method further comprises two drying processes. One
7 drying process is for soybean enzyme (16), wherein the fermented liquid
8 obtained from the first filtering process (12) contains high levels of soybean
9 enzyme and is dried to become enzyme powder that is a high added-value
10 byproduct. Another drying process is for feeding stuff (17), wherein the
11 fermented solid left from the second filtering process (14) is further mixed
12 with nutrients to compose feeding stuff.

13 The characteristic of the method in accordance with the present
14 invention is that the soybeans are fermented before extraction. Although the
15 seed coats of the soybeans contains high levels of isoflavon it is hard to be
16 decomposed then to release the isoflavon. Using *acetobacter aceti*. in the
17 fermenting process destroys the cell walls of the seed coats to release the
18 isoflavon enclosed in the cell walls. Therefore, more isoflavon can be released
19 into the ethanol solution and obtained to generate more isoflavon products.

20 The extraction rate of the isoflavon in the present method is 60 to 70 % based
21 on the total amount of isoflavon in the soybeans, which is significantly higher
22 than an extraction rate of 25 to 30% in the conventional method. Thus, the
23 manufacturing cost of isoflavon is reduced and isoflavon can be commonly
24 used as food additives or further purified to achieve condensed medicine.

1 Additionally, the method can use waste residuum of soybeans as well
2 as complete soybeans to obtain isoflavan so that material cost in this method is
3 low. The fermented liquid obtained from the first filtering process (12)
4 contains soybean enzyme that is a high added-value byproduct in this method.
5 Moreover, the fermented solid obtained from the second filtering process (12)
6 still can be mixed with other nutrients to serve as feeding stuff.

7 Although the invention has been explained in relation to its preferred
8 embodiment, many other possible modifications and variations can be made.